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Research Commentary

Cooperation, Coordination, and Governance in Multisourcing: An Agenda for Analytical and Empirical Research

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Multisourcing, the practice of stitching together best-of-breed IT services from multiple, geographically dispersed service providers, represents the leading edge of modern organizational forms. While major strides have been achieved in the last decade in the information systems (IS) and strategic management literature in improving our understanding of outsourcing, the focus has been on a dyadic relationship between a client and a vendor. We demonstrate that a straightforward extrapolation of such a dyadic relationship falls short of addressing the nuanced incentive-effort-output linkages that arise when multiple vendors, who are competitors, have to cooperate and coordinate to achieve the client's business objectives. We suggest that when multiple vendors have to work together to deliver end-to-end services to a client, the choice of formal incentives and relational governance mechanisms depends on the degree of interdependence between the various tasks as well as the observability and verifiability of output. With respect to cooperation, we find that a vendor must not only put effort in a "primary" task it is responsible for but also cooperate through "helping" effort in enabling other vendors perform their primary tasks. In the context of coordination, we find that task redesign for modularity, OLAs, and governance structures such as the guardian vendor model represent important avenues for further research. Based on the analysis of actual multisourcing contract details over the last decade, interviews with leading practitioners, and a review of the single-sourcing literature, we lay a foundation for normative theories of multisourcing and present a research agenda in this domain.

Key words: multisourcing; offshore outsourcing; cooperation; coordination; output verifiability; observability; relational governance
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1. Introduction, Motivation, and Background

The significant growth in global sourcing of IT and IT-enabled services reflects the extended reach and impact of outsourcing in the modern enterprise. Firms are not just outsourcing transaction-intensive business functions to realize efficiency and cost savings; rather, they are externalizing complex, end-to-end services that often involve multiple vendors. Over the last decade, the modus operandi of outsourcing has undergone a major transformation. In the late 1990s, the typical outsourcing contract involved a single vendor and spanned as much as a decade (e.g., General Motor's 10-year arrangement with EDS, which expired in 2006). Many of the more recent outsourcing arrangements are different in that they involve

several vendors and typically run over a shorter time span. Multisourcing refers to the delegation of IT and IT-enabled services to multiple vendors, who must work collaboratively to deliver services to a client organization. ABN-AMRO's five-year, $2.2 billion outsourcing contract[1] with multiple partners—Accenture, IBM, Infosys, Patni Computer Systems, and Tata Consultancy Services—for applications development, support, enhancement, and infrastructure exemplifies a large multisourcing arrangement that requires cooperation and coordination of multiple vendors to create customer value.

Several factors are driving the multisourcing trend. *FinancialWire* (2008) reports that multisourcing potentially enables firms to reduce the risks of outsourcing failure and also to obtain best-of-breed services for agility (Cohen and Young 2006). Additional benefits of the multisourcing model include access to specialized expertise and capabilities, lower costs of service provision due to competition among vendors, reduction in opportunistic rent appropriation by any one vendor and allied switching costs, reduced exposure to supply side risks,[2] and improved adaptability to changing industry conditions. We analyzed the IDC services contracts database that records details about a large (but not entire) fraction of IT and IT-enabled services outsourcing from 1996 to 2008, and we found the multisourcing phenomenon to be growing significantly. Figure 1 shows the number of multisourcing deals and the total dollars spent using multisourcing over the period 1996–2008 per the IDC database. We observe that the annual number of large-scale multisourcing contracts were in the teens until about 2004 but jumped sharply upward after that. The use of multisourcing peaked in 2007, where 61 such contracts, worth a total of $7.2 billion, were observed.

Overall, there is a significant positive time trend in the usage of multisourcing. Interestingly, there is a significant dip in both the number of deals and dollars spent in 2008. Our initial analysis of outcomes of multisourcing contracts reveals some significant challenges (e.g., premature termination and/or renegotiations) in 2004 and 2005. The jury is still out on whether the observed dip in 2008 is a lag effect of these negative outcomes, reflecting underlying governance challenges or an emergent systemic pattern. More research is needed to draw any definitive conclusions. Looking over the entire set (1996–2008) of single- and multisourcing initiatives, we find that the mean lifetime contract value in the IDC sample of multisourcing contracts is $96.7 million, while the equivalent value in the sample of single-sourced contracts is $81 million. Thus, multisourcing contracts are significantly larger in value than single-sourced contracts. Taken together, these facts suggest that multisourcing is a long-term phenomenon rather than a short-term fad.[3] Despite the potential advantages of multisourcing, interdependencies among various outsourced tasks in multisourcing initiatives pose daunting challenges for the governance of such relationships. In the words of Mark Kobayashi-Hillary, head of research for global sourcing at Indian outsourcer TCS:[4]

> Multisourcing is a complex beast. [It] creates enormous coordination complexity for the client and for the vendors themselves. How do you get multiple vendors to deliver a seamless integrated service? How easy is it to switch to another vendor . . .? Who is ultimately accountable?

In contrast to dyadic client-vendor relationships that have been the subject of extant global sourcing research, multisourcing necessitates individual and collaborative effort of multiple vendors at the back end to come together to create a seamless, integrated service at the front end for the client. Given that the tasks performed by multiple vendors are not independent, there are significant challenges to motivate vendors not only to put in best effort in their primary tasks but also to cooperate with and help other vendors perform their tasks in the best interest of the client. The issue of incentive alignment is further exacerbated by the problem of observability and verification of the quality of inter-related tasks. Accord-

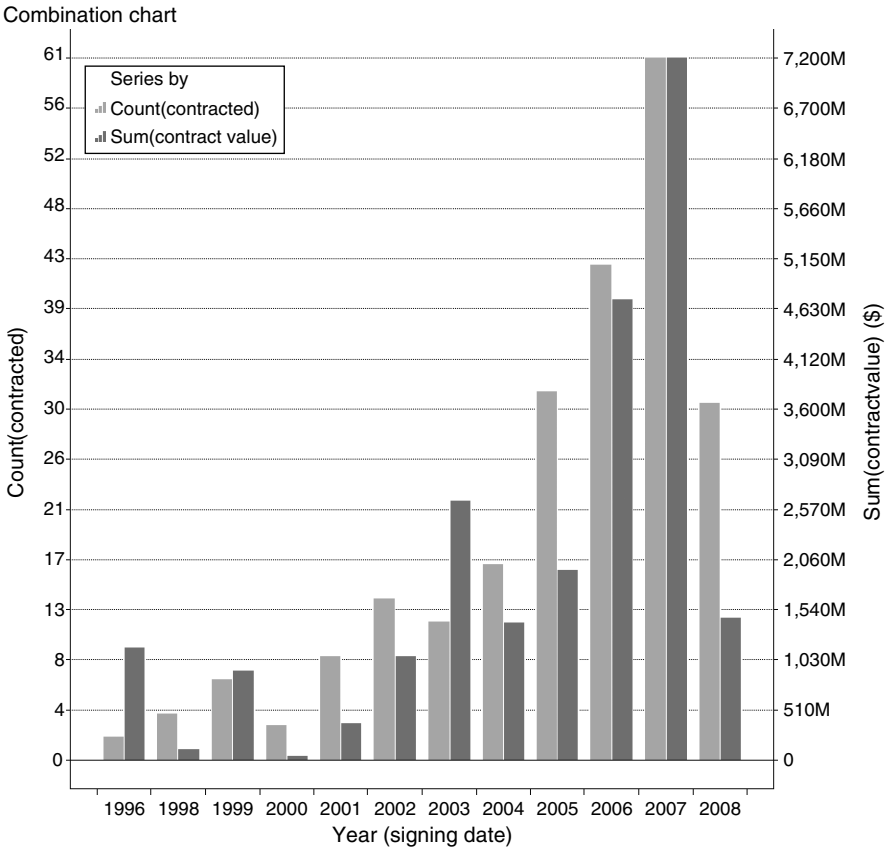
[1] http://www.patni.com/media/36798/The%20Multisourcing%20Imperative.pdf.

[2] The Satyam corporate governance scandal disproportionally impacted clients that solely relied on it for end-to-end services.

[3] http://www.fsn.co.uk/channel_outsourcing/multisourcing_why_is_it_growing_in_popularity.

[4] http://www.silicon.com/management/cio-insights/2006/04/21/opinion-beware-the-multisourcing-pitfalls-39158256/.

Figure 1 Growth of Multisourcing Over the Last Decade



ing to Jamie Erbes,[5] CTO of Hewlett-Packard Software and Solutions:

> . . . with multisourcing you have silos of management and reporting, limited visibility and service-level agreements in silos.

In addition to the incentive alignment related cooperation issue, the governance of inter-organizational relationships also requires attention to coordination or alignment of vendor actions. Coordination is defined as the management of dependencies among various activities (Malone 1987). Malone and Crowston (1990) characterize different types of dependencies as well as coordination mechanisms that are suitable for managing them. Coordination theory developed by Malone and colleagues has been deployed in designing cooperative work systems (Malone and Crowston 1990), analyzing the organization of economic activity within and outside the firm (Malone et al. 1987, Gurbaxani and Whang 1991, Clemons et al. 1993), and the design of processes (Crowston and Osborn 2003). Of particular relevance to us is the strategy literature that has focused on why coordination may be difficult to achieve. It has identified bounded rationality between the firms (even if cooperation incentives are aligned) and a consequent lack of shared understanding of mutual interdependencies in executing the outsourced task as major detriments (Gulati et al. 2005). These shortcomings are, in turn, manifest in problems of alignment in decision making, synchronization, task allocation, resource assignment, and conflict resolution (Milgrom and Roberts 1992).

We present a framework and agenda for research related to incentives and governance structures to foster cooperation and coordination in multisourcing engagements. While incentive and coordination issues have been studied in the context of a single

[5] http://www.forbes.com/2009/12/26/multisourcing-hewlett-packard-technology-cio-network-outsourcing.html.

service provider, the literature on multisourcing is in its nascent stages (Levina and Su 2008). In the section below, we summarize some salient results from the single-sourcing literature, which provide a natural starting point for research in multisourcing.

2. What We Know from the Single-Sourcing Literature

The single-sourcing literature has investigated the decision to outsource, types of governance structures (both formal and informal) that may be suitable for different types of outsourced tasks, and the risks of outsourcing. Lacity et al. (1996) emphasize that critical or strategic differentiators should be kept in-house, useful commodities should be outsourced, while critical commodities, which are essential to keep business on track but which do not differentiate from competitors, should be outsourced when high quality vendors are available. Dibbern et al. (2004) analyze when and what to outsource, how to implement the sourcing decision as well as outcomes of the sourcing decision. The operations literature has used analytical modeling to identify drivers of outsourcing. For example, scale economy has been shown to be a driver of outsourcing (Cachon and Harker 2002) as well as the choice between single- and multisourcing (Benjaafar et al. 2007).

Gopal et al. (2003) demonstrate that the choice of an outsourcing contract depends upon certain vendor, client, and project characteristics such as client MIS experience, client size, project importance for the client, length of prior relationship between client and vendor, and requirements uncertainty. Outsourcing success has been shown to depend upon contract choice (Gopal et al. 2003, Mani et al. 2010), firm reputation (Banerjee and Duflo 2000), and fulfillment of respective obligations by both the client and the vendor (Koh et al. 2004).

The governance mechanism chosen for an outsourcing project must address various risk factors. Aron et al. (2005) identify three main sources of strategic risk in outsourcing: shirking by the vendor, poaching of data, processes or other knowledge specific to a client, and renegotiation and holdup (due to loss in bargaining power of the client for various reasons, including the nature of the contract and increased dependence on the vendor). In addition to strategic risks, there are operational risks, including the inability of the vendor to perform tasks as well as the client firm in the early stages of the engagement (Aron et al. 2005). Unforeseen costs of outsourcing, including vendor search and evaluation, costs of setting up a relationship with the vendor, and those of terminating a relationship have been emphasized as additional risks in an outsourcing engagement (Barthelemy 2001).

Modularity of the outsourced task has been a subject of several research studies in the single-sourcing context. Aron et al. (2005) note that task modularity can be leveraged to mitigate risk in single sourcing. Furthermore, they identify two kinds of task modularity: horizontal and vertical chunkification. Horizontal chunkification implies that a portion of the same activity is allocated between a client and a vendor. Vertical chunkification implies that activities comprising a process are split between the client and the vendor. The operations management literature has used analytical models to focus on call center operations with both horizontal and vertical chunkification (Kim and Park 2010, Gans and Zhou 2007). Specifically, the methods used to split up incoming calls between client and vendors have an important impact on incentives and performance.

In the IS literature, Susarla et al. (2010) demonstrate that high-powered incentives such as fixed prices may be used instead of variable price contracts when the underlying task is modular, implying that modularization increases the verifiability of outsourced tasks. Tanriverdi et al. (2007) investigate the role of process modularity on the outsourcing decision, and find that contrary to expectations, firms tend to offshore processes with low modularity while using domestic outsourcing for those with high modularity. Thus modularity of the outsourced task plays a critical role in the choice of incentives and governance mechanisms, but more research is needed to develop unambiguous prescriptions for better management of single-sourcing. It is also evident that the role of modularity in multisourcing is an uncharted domain with exciting research opportunities.

The above studies (meant to be illustrative rather than exhaustive) provide a starting point to understand a gamut of issues that may also be important in a multisourcing context. For example, factors such

as reputation, prior relationship, and task modularity are likely to affect contract choice as well as outcomes in a multisourcing context. However, we argue that while many of the above issues (e.g., requirements uncertainty, coordination between the client and multiple vendors, etc.) might even be escalated in multisourcing, the latter represents many new challenges not encountered in a single-sourcing context. *The most important differentiating characteristic of a multisourcing environment is the interdependence between the tasks performed by multiple vendors.* By contrast, the supplier selection approaches studied in the operations literature assume independence between the suppliers. Indeed, if multiple vendors worked on independent tasks, then the multisourcing environment would, in principle, be similar to a single-sourcing setup. However, the interdependence between tasks performed by different vendors makes it challenging to provide the right incentives to put in the right effort in ensuring that the client gets the maximum value from the engagement. For instance, when there is shirking of effort in single-sourcing as noted by Aron et al. (2005), it should be immediately evident who the responsible party is (although the client needs to provide evidence of shirking relative to the terms of the contract). However, in multisourcing, it might be challenging to identify which vendor is shirking its responsibilities, because the output of a task in multisourcing might be dependent on the effort of multiple vendors. Such challenges could be exacerbated by the lack of observability and/or verifiability of the task output, an issue we discuss later in this commentary.

Along similar lines, traditional modes of coordination in the single-sourcing context, such as joint action and lower levels of formalization, are an integral part of relational governance mechanisms that promote trust and its underlying normative behaviors between firms (Mani et al. 2011). However, such relational governance (Dyer and Singh 1998) models might not be feasible for multiple vendors. More theoretical and empirical research is needed to study alternative means of fostering trust and mutuality among multiple vendors, including new approaches such as OLAs and the guardian vendor model. Given the interdependency issue between vendors, future research will also look more closely at the risks associated with the multisourcing model. For instance, risk might be mitigated if outcomes for multiple vendors are substitutes and might be exacerbated if they are complementary. Furthermore, multisourcing risk may be higher for noncodifiable tasks than for codifiable tasks (Aron and Singh 2005). However, if a noncodifiable task is divided among multiple vendors and if the incentives are based on relative performance, this risk may be reduced.

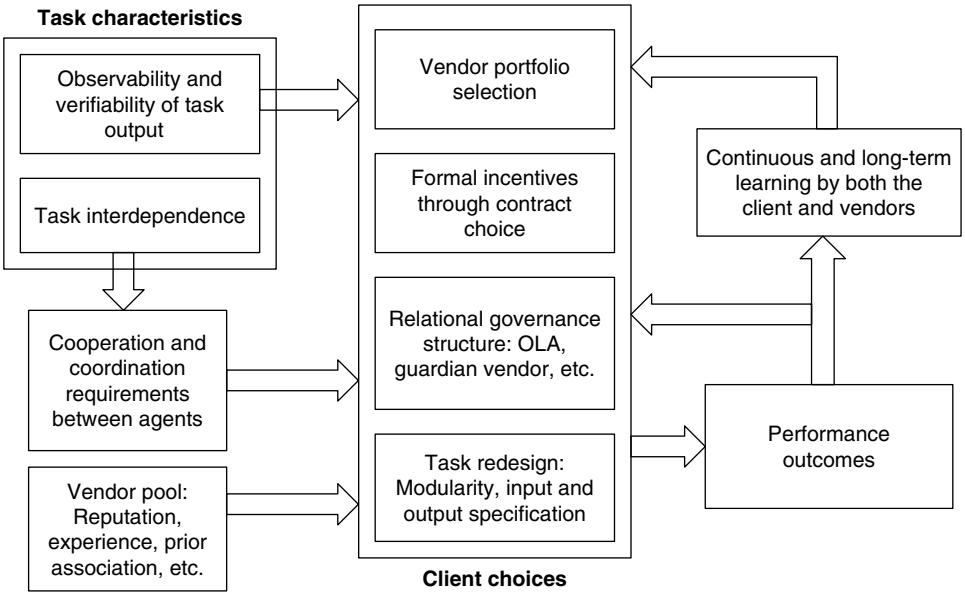
While our analysis reveals evidence of the increased use of multisourcing there is a lack of a systematic framework that can serve as the basis for developing normative theories of multisourcing. We attempt to bridge this gap in the next section.

3. A Framework for Multisourcing Research

Figure 2 represents a framework that captures the unique aspects of task interdependence, cooperation, coordination, incentives, relational governance, and learning in multisourcing and provides a foundation for developing a research agenda in this domain. The model posits the level of task interdependence as a primary factor that determines cooperation and coordination requirements between service providers. As noted earlier, task interdependence makes multisourcing fundamentally different from single-sourcing in that, in the latter case, such cooperation and coordination requirements do not arise due to the task being performed by a single agent.

Task output observability and verifiability (the ability or feasibility to objectively measure vendor output or performance) are two additional factors that are expected to play an important role in incentive design as well as other decisions taken by the client in the initial phases of the engagement. Such decisions include vendor portfolio selection, choice of formal contracts, relational governance mechanisms, as well as redesigning tasks for modularity and improved specification of inputs and outputs. The vendors take the client's choices and exert effort levels that maximize their own utility, whereby the actual output and performance outcomes are realized. Undesirable outcomes such as poor performance and hold-up might lead the client to make major changes to the initial choices (e.g., renegotiations or contract termination), while there is also long-term learning for both the

Figure 2 A Framework for Multisourcing Research



client and the vendors which results in incremental changes and adjustments to the management of the multisourcing relationship. In the balance of this section, we use the conceptual framework to isolate research issues and questions that are pertinent to cooperation and coordination in multisourcing.

3.1. Research Issues Pertaining to Cooperation in Multisourcing

Consider a geographically dispersed transaction system that requires simultaneous support of multiple IT services such as maintenance of the database and application servers as well as the underlying telecommunication networks. In the presence of such task interdependence, there could be interactions between both inputs and outputs of multiple vendors. As a result, a vendor must not only put effort in a "primary" task it is responsible for, but also cooperate through "helping" effort in enabling other vendors perform their primary tasks. For example, the output of the vendor responsible for speed and accuracy of transactions depends upon how the telecommunications backbone is maintained by the vendor. This linkage makes the client firm's choice of incentives more challenging relative to the single-vendor setting.

In the above example, where an applications team has to rely on the services of the telecom infrastructure provider, the helping effort of the latter could take the form of increased information sharing about the network's operating characteristics (e.g., real time loading patterns), and the sharing of APIs to access the myriad of network resources and services. These could then be exploited by the application team for real-time load balancing, faster execution and potentially even localized and personalized services. At the same time, the helping effort of the application team could come in the form of sharing of application usage patterns with the network provider, which in turn could be useful for medium term network capacity planning and upgrade decisions.

While the literature in economics and accounting has developed rich models of principal-agent interaction, multisourcing provides a vista of opportunities in analytical modeling involving interdependent tasks performed by different agents. A model that is tractable and yet rich enough to include the nuances of multisourcing involves a client firm with two interdependent tasks that have been assigned to two vendors (agents). In this two-vendor setting, each task is such that in addition to effort from the primary vendor to which it has been assigned, it needs helping effort from the other vendor as well. The level of task interdependence may be modeled as a parameter with range $[0, 1]$. When this parameter is equal to zero, no cooperation is needed between vendors because

the tasks are independent.[6] As the task interdependence increases, the impact of vendor cooperation on the client's utility also increases. Following the extant single-sourcing literature on compensation schemes to align incentives, it is worthwhile to examine the following research question.

Research Question 1 (RQ1). *Which compensation schemes lead to desirable* (*e.g., first best*) *outcomes in multisourcing*?

In addition to the interdependence issue, the client's incentive design problem is further exacerbated through challenges in output observability and verifiability. For instance, can first best outcomes be achieved if the client designs a variable compensation scheme that equals a fraction of the verifiable output? The effort exerted by vendors in different tasks is difficult to monitor owing to the complexity of tasks and physical distance between client and vendor, leading to extremely high monitoring costs. Hence contractual compensation is often based on the output produced by the vendors. While the individual outputs of various vendors might be observable in many cases, only the total output may be observed in other settings. Consider a two-vendor setting, where one vendor provides network services while the other handles server hosting, with network availability and server availability as the output measures. In this case, each measure is individually observable to the client. However, because the response time for an application running on the server is attributable to both network congestion and server performance, the client might not be able to incentivize the vendors individually on this dimension of performance. Thus, in a multivendor case, incentives might have to be linked to a vendor's own performance, the relative performance of the vendor with other vendors, or the overall team performance of all vendors taken together.

The example of two vendors offering network and server hosting services constitutes a case of verifiable output in the sense that the output can be objectively measured in terms of availability (a binary variable) and response (in units of time). However, it is often not possible to measure output accurately because metrics such as SLAs might not be in exact alignment with the output. Consider a vendor offering business intelligence (BI) services by extracting transaction data from another vendor who provides hosted enterprise resource planning (ERP) services. While objective measures such as frequency of updates and timely access to information may be used to assess the quality of the outputs (inputs) provided by (to) the ERP (BI) services provider, the quality of output as reflected in its impact on decision making, say of fostering higher levels of customer intimacy, is less verifiable than network or server availability and response time. A consequence of such a setting could be that vendors choose effort levels to maximize the observable measures used for providing incentives and not the true output. Thus *verifiability of output* plays an important role in the effectiveness of incentives to elicit the required effort from the vendors. Suppose one vendor provides customer relationship management (CRM) services while another offers supply chain management (SCM) in the form of SaaS. While the outputs of the two vendors are distinct and observable, it is difficult to objectively verify the output quality of either vendor due to the difficulty in specifying suitable SLAs. We capture the dimensions of observability and verifiability of vendor outputs in the 2×2 matrix in Figure 3.

Extant literature in contract theory has addressed some issues in linking incentives to different types of performance yardsticks (Nalebuff and Stiglitz 1983, Lazear 1989, Itoh 1991, Che and Yoo 2001). However, this literature has not considered interdependence between the outputs of agents. Thus, there are opportunities to incorporate unique multisourcing features in analytical models leading to new theoretical results and implications for practice.

As shown in Figure 3, there are four possible cases involving various degrees of verifiability and observability of outputs, which lead to the following research questions.

Research Question 2A (RQ2A). *How should the client choose compensation schemes when only total but not individual output is observable and when such output is not fully verifiable*?

Research Question 2B (RQ2B). *What are the performance outcomes of multisourcing in a setting characterized by high task interdependence and low output observability and/or verifiability*?

[6] Itoh (1991) discusses how to create incentives to help other agents when tasks are independent.

Figure 3 Observability-Verifiability Matrix

	Total output observable	Individual output observable
Output is fully verifiable	Case 1 (Limited informativeness for incentive alignment) e.g., software-as-a-service response time	Case 2 (Most informative for incentive alignment) e.g., network and server availability
Output is partially verifiable	Case 4 (Least informative for incentive alignment) e.g., quality of business intelligence services	Case 3 (Limited informativeness for incentive alignment) e.g., quality of CRM and SCM services

We expect future research to focus on the design of performance measures that reduce measurement distortion from true output. Baker (2000) stresses that choice of performance measures depends on a trade-off between how well they capture the actual productive activity and how much they expose agents to risk. Integrated SLAs, which involve joint assessment of performance, could lead to better outcomes when agents can observe each other's outputs (Che and Yoo 2001, Ma 1988, and Marx and Squintani 2002). If this result holds in the presence of task interdependence, OLAs can possibly be used by agents to monitor each other. Hence, even though OLAs are not contractually enforceable, agents can use them to observe other's actions and make their own effort choices based on these observations. Thus, the related research questions can be stated as follows.

Research Question 3A (RQ3A). *What are the trade-offs between individual and integrated SLAs in terms of effort distortion and risk in multisourcing*?

Research Question 3B (RQ3B). *Do OLAs and integrated SLAs have a complementary impact on performance*?

The IS literature has drawn largely from economic theories of cooperation such as agency theory or transaction cost economics and strategic management to predict the choice of fixed price or variable price contracts in single-vendor outsourcing. Intrinsic to the selection of one of these contracts is the selection of the degree of completeness. A key finding is that when the outsourced task is more complex, variable price contracts are preferred to fixed price contracts (Crocker and Reynolds 1993, Banerjee and Duflo 2002, Bajari and Tadelis 2001). The extrapolation of the above result from a single-vendor, bilateral contracting scenario to the multilateral, multisourcing context is not straightforward because of potential interactions and dependencies between the effort and output levels of different vendors. A related research question is as follows.

Research Question 4 (RQ4). *Under what conditions do we observe the use of high-powered incentives in multisourcing*?

The multisourcing situation exposes the agents not only to output risks from distortion of performance measures from the output, but also to input risks, especially in the case of high task interdependencies (impact on performance due to poor quality inputs from other agents). A related research question involves the impact of input and output risk on agent effort choices.

Research Question 5 (RQ5). *How do input and output risks impact the choice of performance measures and agent effort*?

3.2. Research Issues Pertaining to Coordination in Multisourcing

In addition to the challenge of providing incentives to vendors to cooperate with each other, there are two types of coordination in the multisourcing context—coordination between the client and the vendors as well as that among multiple vendors. Efficient work design requires that the multiple vendors develop a shared understanding of the outsourced task and interdependencies required for task execution. Interfirm interdependence is often characterized in terms of Thompson's (1967) distinction between *sequential, pooled, and reciprocal interdependence*. While Thompson's (1967) lens has been applied to better understand client-vendor coordination (Mani et al. 2011), coordination among multiple vendors is likely a bigger concern in the multisourcing context.

Such analyses must be enriched in the context of task attributes—complexity, modularity, observability, verifiability, or strategic importance—and the chosen incentive structure. For example, the operations literature has studied the impact of contract type on coordination in supply chains (Cachon and Lariviere

2005). Future work on mechanism design for vendor-to-vendor coordination should pay close attention to whether information exchange mechanisms may fill the key role that culture serves in an intraorganizational setting. Information processing theorists (Galbraith 1973, McCann and Galbraith 1981) find that information exchanges between firms vary along three relational dimensions: joint action, degree of formalization, and technological capabilities. However, traditional modes of information exchange and coordination, such as joint action and formalization or control, might involve significant transaction costs and not be feasible among multiple vendors in the multisourcing context.

The challenges of incentivizing vendors in the presence of interdependence and limited observability and verifiability also suggest that through upfront investments in task redesign, it might be possible to ensure better incentive alignment and outcomes. An interesting aspect of clients undertaking significant efforts to redesign and document their tasks for modularity is that this process also serves as a foundation for using high-powered incentives in the form of fixed-price contracts with vendors in the single-sourcing context (Susarla et al. 2010). We found it intriguing in our examination of the IDC data that multisourcing contracts are about 12% significantly[7] more likely to be fixed price as compared to single-sourced contracts. It is feasible that clients realize that a precursor to these complex relationships is engaging in significant task redesign and input-output specifications, and an interesting by-product of this might be the ability to use high-powered incentives. Clearly, more research is needed to explore possible connections between modularity and the chosen incentive system.

The need to identify useful modes of coordination among multiple vendors that address interdependencies between them at relatively lower transaction costs is critical to the success of a multisourcing engagement. Task redesign for modularity, OLAs and governance structures such as the guardian vendor model represent important avenues for further research in this space. For example, if the underlying task in the multisourcing context relatively is modular and simple, its ownership and control could be transferred to the vendors through more complete contracts with clearly specifiable performance standards. In such case, cognitive conflict and frictional transaction costs might assume more importance than incentive conflict and opportunistic transaction costs in determining the governance structure. It would be useful to empirically examine the relative influence of these transaction costs in determining the governance structure. Some specific research questions include the following.

Research Question 6A (RQ6A). *To what extent do task redesign, OLA and hierarchical control reduce interdependence in the multisourcing context? Do they function as complements or substitutes?*

Research Question 6B (RQ6B). *How do task attributes—modularity, strategic importance, complexity—influence the level of vendor-to-vendor coordination in multisourcing?*

In addition to the coordination challenges above, the absence of objective operational measures for coordination between agents causes problems in identifying the source of any problem, while agents have to spend more coordination effort in an ad hoc manner to rectify outstanding issues. Thus, identifying a set of operational performance measures that are complementary to outsourced tasks and help agents coordinate better is an issue for future research. The growing popularity of OLAs to achieve inter-vendor coordination leads to several empirical research questions.

Research Question 7A (RQ7A). *How does client involvement in the definition and execution of OLA affect performance outcomes in multisourcing?*

Research Question 7B (RQ7B). *Even though OLAs cannot be formally verified, under what conditions (e.g., alignment between SLAs and OLAs) are vendors more likely to adhere to such specifications?*

Along with OLAs, the "guardian vendor" model is gaining traction as a means to achieve coordination. However, this model has its own challenges. The problem of moral hazard is present in the guardian

[7] The proportion of fixed-price multisourcing contracts in close to 60%, whereas for single-sourced contracts the proportion is 48.2%. The difference is significant at the 1% level with a Z-value of -3.77.

model, while other vendors might resent the authority of the guardian vendor under the suspicion that the latter could distort the truth to the client. Furthermore, not only does the client still engage in multilateral contracts with multiple vendors but also has to consider the guardian's ability to ensure cooperation and coordination in determining its overall relationship structure. There is little in the academic literature on the guardian vendor model. An exception is the work of Goldfayn (2006), who analyzes a scenario with a main contractor who monitors a subordinate contractor. Extensions of this model to the case of imperfect observability and verifiability constitute interesting research questions.

Research Question 8A (RQ8A). *Does the guardian model reduce trust among vendors in a multisourcing arrangement*?

Research Question 8B (RQ8B). *What aspects of the engagement should be handled by the guardian vendor and the client*?

4. Conclusions

Multisourcing is emerging as an important interorganizational, collaborative form of value creation for firms that are now comfortable with the outsourcing paradigm. However, little is known about the underlying theory and management principles that can make or break these arrangements. We demonstrate that linear extensions of dyadic client-vendor IT outsourcing relationships are insufficient to capture the nuances of the multisourced environment. In particular, when multiple vendors have to work together to deliver services to a client, we find that agents' efforts critically hinge on degree of interdependence between the various tasks as well as the observability and verifiability of their output. Such interlinkages are absent in the single-sourcing environment. A key attribute of this setting is that the vendor's ability to satisfy the client depends not only on its own "primary" effort but also on the other vendors' "helping" effort.

Together, the cooperation, coordination, and governance framework described in this paper lays a foundation for normative theories of multisouring. Future research will develop, refine, and test such theories against observed practice. We expect future research to also look closely at client-vendor and, perhaps more interestingly, vendor-to-vendor learning in multisourcing. The literature on learning in single-sourcing is sparse at best. Ethiraj et al. (2005) investigated capabilities developed by software service providers through repeated interactions with a client and through investments in knowledge building. Mani et al. (2009) focus on relational learning effects on the client side that occur through repeated interactions with the provider and procedural learning effects across a portfolio of outsourcing initiatives that occur through repeated management of similar vendor alliances. These studies focus on client-vendor dyads, while a significant amount of learning in multisourcing is expected to occur between vendors. Research on learning in multisourcing must therefore create an appropriate taxonomy of types of learning between vendors and investigate formal and informal mechanisms that can facilitate such learning for better outcomes. Finally, we believe that research on multisourcing has the potential to be predictive of the industry structure and forthcoming merger and acquisitions activity in the IT services industry. We expect vendors that master the art of competing and cooperating at the same time will emerge as long-term winners who will be able to grow larger value pies and appropriate economic rents.

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